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EXAMINER	
HON, SOW FUN	
ART UNIT	PAPER NUMBER
1794	
NOTIFICATION DATE	DELIVERY MODE
03/09/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

Office Action Summary	Application No.	Applicant(s)	
	10/562,050	KOMITOV ET AL.	
	Examiner	Art Unit	
	SOPHIE HON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12/16/08*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-19* is/are rejected.

7)☒ Claim(s) *5 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/19/08 has been entered.

Declaration under 37 C.F.R. 1.131

Withdrawn Rejections

2. The 35 U.S.C. 102(e) and 103(a) rejections of claims 1-4, 6-19 over Miyachi as the primary reference are withdrawn due to Applicant's affidavit filed 11/19/08 that swears behind the effective filing date of October 7, 2003 of Miyachi.

New Rejections

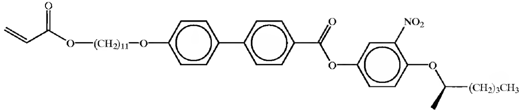
Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 11-12, 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Stebler (US 2001/0005249 A1).

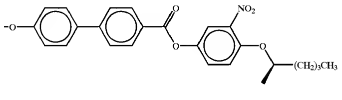
Regarding claims 1, 12, Stebler teaches a liquid crystal device comprising a liquid crystal bulk layer presenting a surface-director at a bulk surface thereof, and a surface-director alignment layer arranged to interact with the bulk layer at said bulk surface for facilitating the obtaining of a preferred orientation of the surface director of the bulk layer (dynamic surface alignment layer interacting with the bulk layer, [0001]). Stebler teaches that the orientation of the molecules of the liquid crystal bulk layer and the orientation of the surface-director alignment layer each is directly controllable by an electric field via dielectric coupling (bulk layer formed by a nematic liquid crystal having a threshold voltage for dielectric switching above that of the dynamic alignment layer [0041]). Stebler teaches that the surface-director alignment layer comprises a polymer formed from the monofunctional monomer (A1b, [0055]) shown on the next page.



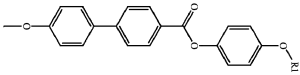
Stebler teaches that the resultant polymer formed from the monofunctional monomer shown above, has side-chains which orientation is directly controllable by an electric field (free end to move and thus be switchable by an applied electric field, [0056]). The right end of this monofunctional molecule is a polymerizable unsaturated ethylenic group which polymerizes to form the polymeric backbone, leaving a pendant side-chain that is attached to the polymeric backbone via the –COO-$(CH_2)_{11}$)- moiety functioning as a spacer group, and is free to move and be switched by the applied electric field, as described above.

Although Stebler fails to disclose that the orientation of the side-chain is not just directly controllable by the electric field, but more specifically via dielectric coupling, where the claimed and prior art products are identical or substantially identical in structure and composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, and the claimed properties are presumed to be inherent. See MPEP 2112.01. If there were to be any differences in structure or chemistry, these differences are presumed to be minor and obvious in the absence evidence to the contrary. In the instant case, Stebler teaches that the monofunctional molecule A1b shown above has a polymerizable unsaturated ethylenic end group which polymerizes to form a polymeric backbone that lacks directly coupled ring structures, leaving a pendant side-chain

shown below that meets the claimed limitation of (iii) in being attached to the polymeric backbone via the –COO-$(CH_2)_{11}$)- moiety functioning as a spacer group having at least two spacing atoms, and meets the claimed limitation (i) in comprising two unsubstituted phenyls coupled via a carbon-carbon single bond.



Thus the free pendant side chain moiety, shown above, of the polymer formed from the monofunctional monomer A1b of Stebler ([0055]), meets the presently claimed limitations (i) and (iii). Furthermore, this free pendant side chain has an analogous structure to that of the free pendant side chain disclosed in Applicant's specification and shown below (page 26, formula (IX)).



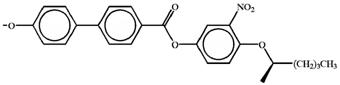
Therefore, in the absence of a showing to the contrary, the free pendant side chain moiety of the polymer formed from the monofunctional monomer A1b of Stebler is expected to meet the claimed limitation (ii) in exhibiting a permanent and/or induced dipole moment that in ordered phase provides dielectric anisotropy, like the pendant side chain moiety disclosed in Applicant's specification (page 24, lines 24-31), and hence its orientation is directly controllable by the electric field specifically via dielectric coupling.

Regarding claim 11, Stebler teaches that the liquid crystal bulk layer comprises a nematic liquid crystal ([0076], [0041]).

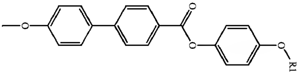
Regarding claim 14, Stebler teaches a method for manufacturing a liquid crystal device ([0001]), comprising the steps of providing a surface-director alignment layer on an inner surface of at least one substrate (inner surface of glass substrate 4, passive SiOx alignment layer 8 now precoated, to manufacture dynamic alignment layer 10, [0055]), and sandwiching a liquid crystal bulk layer between two substrates (confined between cell substrates 4 and 20, [0056]), said liquid crystal bulk layer presenting a surface-director at a bulk surface thereof ([0001]), and said surface-director alignment layer arranged to interact with the bulk layer at said bulk surface (dynamic surface alignment layer interacting with the bulk layer, [0001]) for facilitating the obtaining of a preferred orientation of the surface-director of the bulk layer (induced in-plane switching in bulk layer, [0068]), wherein the orientation of the molecules of the liquid crystal bulk layer and the orientation of the surface-director alignment layer each is directly controllable by an electric field via dielectric coupling (bulk layer formed by a nematic liquid crystal having a threshold voltage for dielectric switching above that of the dynamic alignment layer [0041]). Stebler teaches that the surface-director alignment layer comprises a polymer formed from a monofunctional monomer (A1b, [0055]) that has side-chains which orientation is directly controllable by an electric field (free end to move and thus be switchable by an applied electric field, [0056]).

Although Stebler fails to disclose that the orientation of the side-chain is not just directly controllable by the electric field, but more specifically via dielectric coupling,

where the claimed and prior art products are identical or substantially identical in structure and composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, and the claimed properties are presumed to be inherent. See MPEP 2112.01. If there were to be any differences in structure or chemistry, these differences are presumed to be minor and obvious in the absence evidence to the contrary.



In the instant case, the free pendant side chain moiety, shown above, of the polymer formed from the monofunctional monomer A1b of Stebler ([0055]), has an analogous structure to that of the free pendant side chain disclosed in Applicant's specification and shown below (page 26, formula (IX)).



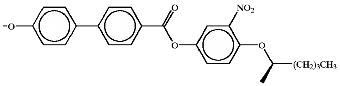
Therefore, in the absence of a showing to the contrary, the free pendant side chain moiety of the polymer formed from the monofunctional monomer A1b of Stebler is expected to have its orientation to be not just directly controllable by the electric field, but more specifically via dielectric coupling.

Regarding claim 15, Stebler teaches a method of controlling a liquid crystal bulk layer comprising the step of aligning a liquid crystal bulk layer presenting a surface-

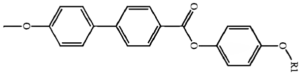
director at a bulk surface thereof by use of a surface-director alignment layer arranged to interact with the bulk layer at said bulk surface for facilitating the obtaining of a preferred orientation of the surface-director of the bulk layer ([0001]). Stebler teaches that the orientation of the molecules of the liquid crystal bulk layer and the orientation of the surface-director alignment layer each is directly controllable by an electric field via dielectric coupling (bulk layer formed by a nematic liquid crystal having a threshold voltage for dielectric switching above that of the dynamic alignment layer [0041]).

Stebler teaches that the surface-director alignment layer comprises a polymer formed from a monofunctional monomer (A1b, [0055]) that has side-chains which orientation is directly controllable by an electric field (free end to move and thus be switchable by an applied electric field, [0056]).

Although Stebler fails to disclose that the orientation of the side-chain is not just directly controllable by the electric field, but more specifically via dielectric coupling, where the claimed and prior art products are identical or substantially identical in structure and composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, and the claimed properties are presumed to be inherent. See MPEP 2112.01. If there were to be any differences in structure or chemistry, these differences are presumed to be minor and obvious in the absence evidence to the contrary.



In the instant case, the free pendant side chain moiety, shown above, of the polymer formed from the monofunctional monomer A1b of Stebler ([0055]), has an analogous structure to that of the free pendant side chain disclosed in Applicant's specification and shown below (page 26, formula (IX)).



Therefore, in the absence of a showing to the contrary, the free pendant side chain moiety of the polymer formed from the monofunctional monomer A1b of Stebler is expected to have its orientation to be not just directly controllable by the electric field, but more specifically via dielectric coupling.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 2-4, 6, 8-10,17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stebler as applied to claims 1, 11-12, 14-15 above.

Stebler teaches the liquid crystal device comprising the liquid crystal bulk layer and the surface-director alignment layer, as described above.

Regarding claims 2-3, Stebler fails to disclose both the sign of the dielectric anisotropy of the liquid crystal bulk layer and the sign of the dielectric anisotropy of the at least one surface-director alignment layer in a single embodiment.

However, Stebler teaches in one embodiment that one surface-director alignment layer has a positive dielectric anisotropy while the other of the pair of surface-director alignment layers has a negative dielectric anisotropy (spontaneous polarization [0078]), without disclosing the sign of the dielectric anisotropy of the liquid crystal bulk layer, and further teaches that the sign of the dielectric anisotropy of the liquid crystal bulk layer can be either negative in a second embodiment ([0072]) or positive in a third embodiment ([0075]) without disclosing the sign of the dielectric anisotropy of the at least one surface-director alignment layer. This lack of specificity implies that the signs of the dielectric anisotropies of the surface-director alignment layer and the liquid crystal bulk layer can be either positive or negative, and can be either the same or opposite, for the purpose of providing the desired preferred orientation of the surface-director of the bulk layer ([0001]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided a combination of dielectric anisotropies of opposite signs or of the same sign, for the surface-director alignment layer and liquid crystal bulk layer in the liquid crystal device of Stebler, in order to obtain the desired preferred orientation of the surface-director of the bulk layer, as taught by Stebler.

Regarding claim 4, Stebler teaches in one embodiment that one surface-director alignment layer has a positive dielectric anisotropy while the other of the pair of surface-director alignment layers has a negative dielectric anisotropy (spontaneous polarization [0078]), without disclosing the sign of the dielectric anisotropy of the liquid crystal bulk layer, and further teaches that the sign of the dielectric anisotropy of the liquid crystal

bulk layer can be either negative in a second embodiment ([0072]) or positive in a third embodiment ([0075]) without disclosing the sign of the dielectric anisotropy of the at least one surface-director alignment layer. This means that the sign of the dielectric anisotropy of the liquid crystal bulk layer in the first embodiment can be either negative or positive, for the purpose of providing the desired preferred orientation of the surface-director of the bulk layer ([0001]). In either event, the liquid crystal bulk layer and a first of the pair of surface-director alignment layers will exhibit dielectric anisotropies of opposite signs, and the liquid crystal bulk layer and the second surface-director alignment layer will exhibit dielectric anisotropies of the same sign.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided the dielectric anisotropy of the liquid crystal bulk layer in the one embodiment of the liquid crystal device of Stebler, with a sign that is either negative or positive, such that the liquid crystal bulk layer and the first surface-director alignment layer will exhibit dielectric anisotropies of opposite signs, and the liquid crystal bulk layer and the second surface-director alignment layer will exhibit dielectric anisotropies of the same sign, in order to obtain the desired preferred orientation of the surface-director of the bulk layer, as taught by Stebler.

Regarding claim 6, Stebler teaches that the liquid crystal device further comprises at least one confining substrate, and wherein an orthogonal projection of said surface-director on said substrate, termed projected surface-projector, presents said preferred orientation in a geometrical plane in parallel with said substrate, which is the preferred field-off planar orientation (in the off-state, the nematic is oriented

homogenously planar, [0076]), and the orientation of the molecules of the bulk layer is directly controllable by an applied electric field to perform an out-of-plane switching of said preferred field-off planar orientation of the projected surface-director to a field-induced vertical orientation (homeotropic out-of-plane switching, [0041], perpendicular, homeotropic orientation, [0074]).

Regarding claim 8, Stebler teaches that the electric field can be applied normally to said at least one confining substrate (perpendicular direction across a liquid crystal bulk layer, [0002], [0067], Fig. 2).

Regarding claim 9, Stebler teaches that the liquid crystal device further comprises at least one confining substrate, and that the orientation of the molecules of said bulk layer is directly controllable by an applied electric filed to perform an in-plane switching of an initial first planar orientation to a field-induced second planar orientation, wherein an orthogonal projection of said surface-director, termed projected surface-director, presents said preferred orientation in a geometrical plane in parallel with said substrate, termed preferred field-induced planar orientation (in-plane switching, switch taking place in a plane parallel with the substrates 4 and 20, [0068]).

Regarding claim 10, Stebler teaches that the electric field can be applied in parallel with said at least one confining substrate (over the dynamic alignment layer as opposed to across, [0031]).

Regarding claims 17-19, Stebler teaches that the liquid crystal bulk layer can comprise a nematic liquid crystal ([0041]).

5. Claims 7, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stebler as applied to claims 1-4, 6, 8-12, 14-15, 17-19 above, and further in view of Robinson (US 5,973,817).

Stebler teaches the liquid crystal device comprising the at least one confining substrate, the liquid crystal bulk layer and the surface-director alignment layer, wherein the liquid crystal bulk layer and the surface-director alignment layer can exhibit dielectric anisotropies of opposite signs, as discussed above. Stebler fails to teach that an orthogonal projection of said surface-director on a geometrical plane perpendicular to said substrate, termed projected surface-director, presents a preferred field-off vertical orientation, where the orientation of the molecules of said bulk layer is directly controllable by an applied electric field to perform an out-of-plane switching of said preferred field-off vertical orientation of the projected surface-director to a field-induced planar orientation.

However, Robinson teaches a liquid crystal device comprising at least one confining substrate (11, 12, Fig. 15, column 9, lines 1-10), and a liquid crystal bulk layer (18, Fig. 15, column 9, lines 44-46) presenting a surface-director at a bulk surface thereof, wherein an orthogonal projection of said surface-director is on a geometrical plane perpendicular to said substrate, when the voltage is off (in the absence of an applied field, the liquid crystal molecules are aligned normal to the surface of the cell, column 10, lines 54-60, No field, Fig. 15), which is the preferred field-off vertical orientation, and the orientation of the liquid crystal molecules perform an out-of-plane switching from the preferred field-off vertical orientation to a field-induced planar

orientation (Applied field on, Fig. 15). Robinson teaches that this field-induced planar orientation provided by out-of-plane switching is done with liquid crystal molecules having dielectric anisotropy (rotate, column 10, lines 54-65), and provides a desired device modulation (column 10, lines 60-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided as the bulk liquid crystal layer in the liquid crystal device of Stebler, an alternate bulk liquid crystal layer where the liquid crystal molecules with dielectric anisotropy, perform an out-of-plane switching from a field-off vertical orientation, wherein the orthogonal projector of the surface-director is on a geometrical plane perpendicular to the substrate, to a field-induced planar orientation, in order to provide the desired device modulation, as taught by Robinson.

Regarding claim 16, Stebler teaches that the electric field can be applied normally to said at least one confining substrate (perpendicular direction across a liquid crystal bulk layer, [0002], [0067], Fig. 2).

Response to Arguments

6. Applicant's arguments regarding claims 1-4, 6-12, 14-19 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

7. Claims 5, 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the

base claim and any intervening claims. The closest cited prior art of record, US 2001/0005249 fails to fairly teach or suggest, even in combination with US 5,973,817, a liquid crystal device comprising a liquid crystal bulk layer presenting a surface-director at a bulk surface thereof, and a surface-director alignment layer comprising side-chains arranged to interact with the bulk layer at said bulk surface for facilitating the obtaining of a preferred orientation of the surface-director of the bulk layer, wherein the orientation of the molecules of the liquid crystal bulk layer and the orientation of said side-chains of the surface-director alignment layer each is directly controllable by an electric field via dielectric coupling, and the surface-director alignment layer comprises structural parts exhibiting dielectric anisotropies of opposite signs. None of the references teach a surface-director alignment layer that comprises structural parts exhibiting dielectric anisotropies of opposite signs.

8. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The closest cited prior art of record, US 2001/0005249 fails to fairly teach or suggest, even in combination with US 5,973,817, a liquid crystal device comprising a liquid crystal bulk layer presenting a surface-director at a bulk surface thereof, and a surface-director alignment layer comprising side-chains arranged to interact with the bulk layer at said bulk surface for facilitating the obtaining of a preferred orientation of the surface-director of the bulk layer, wherein the orientation of the molecules of the liquid crystal bulk layer and the orientation of said side-chains of the surface-director alignment layer each is directly controllable by an electric field via

dielectric coupling, wherein the surface-director alignment layer comprises a polymer which is a polyvinyl acetal, having a polymeric backbone and side-chains attached thereto, said polymeric backbone lacks directly coupled ring structures and at least some of the side-chains (i) comprises a least two unsubstituted and/or substituted phenyls coupled via a coupling selected from the group consisting of a carbon-carbon single bond (-), a carbon-carbon double bond containing unit (-C=C-), a methylene ether unit (-CH2O-), an ethylene ether unit (-CH2CH2O-), an ester unit (-COO-) and an azo unit (-N=N-), (ii) exhibits a permanent and/or induced dipole moment that in ordered phase provides dielectric anisotropy, and (iii) is attached to the polymeric backbone via at least two spacing atoms. None of the references teach that the polymer is a polyvinyl acetal having side-chains which have components (i)-(iii).

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks, can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sophie Hon/
Examiner, Art Unit 1794